

NEW WESTERN TIPULA.

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Kertész's "Catalogue Dipteriorum" vol. II ("conclusum exitu anni 1900") lists 309 species belonging to the genus *TIPULA*. In 1901 I published descriptions of 52 additional species. Between that time and this there have appeared in various journals descriptions of some 16 other species, 7 of which are American. This makes a total of 377 species described before the beginning of 1911.

All who have worked with the genus know that long ago it became unwieldy and realize that it should be divided into a number of smaller genera. But no one has yet been able to separate the genus into groups well enough defined to be worthy of generic or even subgeneric rank. My studies have convinced me that any satisfactory division of the group must be founded on a study of the structure of the hypopygium. This will mean that all the types that are available will have to be re-examined, for few if any of the earlier descriptions describe this organ in any detail, even the late descriptions refer only briefly to the more conspicuous parts and pass the others over entirely. That the structure of these often remarkably complicated organs is the final test for the determination of species has been demonstrated time and again when two or more forms, exactly alike in all other respects, have been found to exhibit constant striking differences in the structure of the hypopygium.

Hesitating to add still more species to the genus until some such a division is made, I have refrained from publishing descriptions of new species, having during the last ten years described only a few forms that were, on one account or another, of particular interest. I find now that I have in our collections here many undescribed species some of which I have been sending out to my correspondents with manuscript names. In order that these names may be legitimate and that I may more easily keep our large collection of Tipulidæ in better shape, I have decided to publish descriptions of a few of the undescribed species that I now have before me, confining myself, in this paper, to western forms.

***Tipula acutipleura* n. sp.**

Light brown; head grayish brown, with a brown line above; rostrum yellowish with a brown stripe laterally; palpi brown; first and second segment of antennæ yellow; third segment fusiform, yellowish, darker in the middle, remaining segments growing darker, those beyond the fifth wholly brown, each darker and somewhat incrassated at the base; collare lighter brown with three brown spots; mesonotum very light brown with four rather broad brown stripes; coxæ, pleura, scutellum and metanotum hoary, the latter with three narrow stripes which are less hoary; halteres yellow, knobs brown; legs yellowish, tarsi and the tips of the femora and tibia brown; abdomen light brown with a rather broad brown line above; eighth sternite narrowed posteriorly, posterior margin with a shallow rounded incision from the sides of which arise tufts of rather long, stiff, curved, yellow hairs; ninth tergite small with a deep V-shaped incision and a narrow median depression; ninth sternite almost divided by a deep broad U-shaped incision in which hangs a pair of yellow tumid appendages; pleural suture almost completely setting off the somewhat triangular pleura which are produced posteriorly into a rather long acute black-tipped process; upper pair of appendages spatulate, tips with long black hairs, lower pair broad, flattened, yellow, distal margin black, more strongly chitinized and somewhat twisted; wings hyaline with a slight grayish tinge; an indistinct whitish band beginning in front of the stigma and extending into the base of the fourth and fifth posterior cells; another indistinct whitish spot in the middle of the first and the bases of the second and third posterior cells; stigma and a small spot over the tip of the auxilliary vein brown; discal cell more than three times as long as wide; Length 11 mm., wing 12 mm.

Habitat: San Diego, Cal. 1 male.

***Tipula atrisumma* n. sp.**

Male: brownish yellow; head grayish brown with a darker brown line above; rostrum yellowish, somewhat grayish above; palpi wholly brown; first and second segments of antennæ yellow, others wholly brown, those beyond the fourth slightly incrassate at the base; collare brownish with two yellow spots; mesonotum yellowish, with three broad brown stripes the median one divided by a faint gray line; coxæ pleura and metanotum hoary; scutellum brownish yellow; halteres brownish, knobs darker; legs brownish yellow, tarsi and tips of femora and tibia darker; abdomen yellowish with a very broad brown line above, posterior margin of segments yellow; posterior margin of eighth sternite with a median pair of short yellow projections which are but little longer than wide; median one-third of ninth tergite yellow, rest brown, with a broad deep incision and a median depression; just below the median portion of the groove is a pair of short, black, highly chitinized, triangular plates; ninth sternite with a deep very broad U-shaped incision from the lateral margins of which hangs a pair of short slightly tumid processes; pleural sutures complete; pleura produced into a

rather long somewhat curved process the black tip of which ends in two short points; first pair of appendages spatulate, second pair broad, flattened, twisted and ending in two short black tips the upper one of which is longer, broader and triangular; wings hyaline; stigma brown; the indistinct whitish line not reaching the base of the fourth posterior cell.

Female: First and second joint of antennæ yellow, third and sometimes the fourth somewhat yellowish, others brown; eighth tergite a little shorter than the seventh; eighth sternite about as long as the seventh; posterior margin with a crescent-shaped incision and depressions; the apical appendages, corresponding to the lower valves of the ovipositor, are short, quadrate, upper margins more strongly chitinized with the edge twisted or rolled, posterior margins with sharp-pointed triangular processes ninth tergite about half as long as eighth; tenth tergite narrow, about twice as long as ninth ending posteriorly in a pair of short, round-tipped lobes, beneath which is a broad, short, unchitinized appendage which also ends in a pair of short lobes similar to those above; ninth sternite, lying above the eighth sternite, consists of two strongly chitinized lateral plates which are united posteriorly into a rather long sharp process. Length, male 9 mm.; female 11 mm., wing 10 mm.

Habitat: San Diego, Cal. 11 ♂, 5 ♀.

Tipula incurva n. sp.

Brown; head grayish brown; rostrum yellowish brown; palpi brown; first, second and third joints of antennæ yellow, others brown, cylindrical, slightly darker at base; collare grayish brown with four brown spots; mesothorax grayish brown with four brown stripes, the median ones indistinctly divided by grayish lines; coxæ and pleura hoary; scutellum and metathorax yellowish; halteres yellow, knobs brown; femora yellow; tarsi, tibia and tip of femora brown; abdomen yellowish brown with the anterior margin of each segment darker brown; ninth tergite brown, short, broad, with an inconspicuous median ridge, posterior margin with a slight crescent-shaped incision; posterior lateral angles ending in short, blunt, downward-projecting processes; ninth sternite with a broad rounded incision from the posterior lateral angles of which arises a pair of two-lobed inward and upward projecting appendages, the lower lobe being much the smaller of the two; second pair of pleural appendages almost concealed by the first which are rather broad, flattened and bluntly pointed at the tip; wings with a brownish tinge; a rather broad, whitish band beginning in front of the stigma and extending through the basal cells a short distance from their tips to the sixth vein, along which it extends to the posterior margin of the wing; an irregular whitish spot about the middle of the axillary cell; another covering the basal two-thirds of the discal cell, and another in the base of the second marginal and sub-marginal cell; stigma brown; discal cell twice as long as wide. Length 10 mm., wing 11 mm.

Habitat: Nebraska. 1 male.

***Tipula alta* n. sp.**

Brown; head brown; rostrum yellow; palpi yellow darker toward the tips; first and second joints of antennæ yellow, others brown, segments rather long, cylindrical; collare light brown with three darker brown spots; mesothorax grayish brown with three brown stripes, the median one divided by a grayish line; pleura hoary; scutellum and metathorax yellowish the latter somewhat hoary; halteres brown, knobs darker brown; legs yellowish, tarsi and tips of femora and tibia brownish; abdomen brownish yellow, with a broad dorsal line and interrupted lateral brownish bands; posterior margin of eighth sternite with a crescent-shaped incision from the posterior margin of which arise two tufts of rather long yellow hairs; ninth tergite with a broad, deep V-shaped incision the margins of which are black; ninth sternite yellow, with a broad, deep depression; pleural suture very short; pleura yellow, somewhat triangular, first pair of appendages small, spatulate, second pair broad, flat, the lower branch somewhat hooked-shaped and black-tipped; wings hyaline; stigma brown; an indistinct interrupted whitish band beginning in front of the stigma and extending into the base of fourth posterior cell; discal cell in the single specimen before me open. Length 9 mm., wing 9 mm.

Habitat: Lander, Wyoming. 1 male. Alt. 5,000 to 8,000 feet.

This is the first *Tipula* I have seen with an open discal cell. As I have only a single specimen before me I do not know whether this is a constant character or only accidental.

***Tipula marina* n. sp.**

Brown; head grayish brown; rostrum grayish brown; palpi dark brown; antennæ wholly dark brown; segments beyond the third somewhat excised below; collare grayish brown; mesonotum light brownish with three broad, dark brown stripes, each of which is divided by a light brown line; coxæ, pleura, scutellum and metanotum grayish, somewhat hoary; halteres brownish, knobs darker; legs brownish, base of femora and tibia somewhat yellowish; abdomen brown, posterior margins of segments narrowly, lateral margins, broadly lighter; ninth tergite reddish brown, darker toward the base, posterior lateral angles somewhat produced, tips rounded; with a median deep, narrow V-shaped incision; no pleural suture; third pair of appendages short, tumid, brownish yellow, covered with short yellow hair; wings with a brownish tinge much lighter toward the base; the rather broad whitish space bordering the fourth vein extends through the discal cell and the fourth posterior cell to the posterior margin of the wing, in the region of the præfurca it widens and extends to the anterior margin and sends a broad irregular shaped arm through the second basal cell; bases of the marginal, sub-marginal and first posterior cells whitish; veins and stigma brown. Length male 13 mm., wing 13 mm.

Habitat: Palo Alto, Cal. 3 males.

Differs from *T. tristis* Doane, which it somewhat resembles in being larger, darker, wings darker and in the V-shaped incision on the posterior margin of the ninth tergite being broader posteriorly, narrower anteriorly and much deeper.

***Tipula fulvinodus* n. sp.**

Brown; head brownish, cinereous above with a median broad, brown stripes; rostrum yellowish on the sides; palpi brown; first and second segment of antennæ yellowish; third brownish yellow, others light brown; dorsum of thorax very light brown with three broad, brown stripes each of which is divided by a gray line; scutellum, metanotum and pleura grayish pruinose; halteres light brown, base yellow, knobs darker brown; legs yellowish, tips of femora, tibia and tarsi darker; abdomen brown, darker posteriorly with three darker brown stripes, posterior margin of each segment yellowish; posterior margin of eighth sternite with a rather deep incision, posterior lateral angles each having a tuft of long yellow hair; posterior margin of ninth tergite with a Y-shaped incision, lateral angles rounded, yellow; ninth sternite with a broad rounded incision in which hangs a pair of whitish appendages the tips of which are brown, flattened and covered with thick, short yellow hair; pleural suture very indistinct, pleura whitish; first pair of appendages whitish, long, very slender, slightly curved; second pair broad, flattened, tips with two black teeth; third pair long, narrow, slightly wider toward the tips; wings hyaline; stigma brown; a whitish spot just beyond the stigma and a faint broken, hardly perceptible whitish band beginning in front of the stigma and extending through the discal cell into the base of the fourth posterior cell. Length 12 mm., wing 13 mm.

Habitat: Grand Coulee, Wash. 1 male.

***Tipula nigrocorporis* n. sp.**

Head and thorax blue-black; palpi dark brown, reddish brown toward the tips; antennæ dark brown, second segment yellowish; joints of flagellum deeply incised, dorsum of thorax with three rather indistinct brown lines; femora yellow, tips brown; tibia and tarsi brown; halteres yellowish, knobs brown; first segment of abdomen black, others brownish yellow with a brown, lateral stripe, the sixth, seventh and eighth quite brown, yellowish posteriorly; ninth tergite with a broad, deep, crescent-shaped incision; ninth sternite with a deep V-shaped incision which almost separates the two sides of the segment; pleural plates distinctly separated from the lateral parts of the sternum; wings light brownish with four indistinct whitish spots, one before and one just behind the stigma, a larger one in the middle of the second basal cell and a fainter one in the middle of the anal and axillary cells. Length male 16 mm., wing 18 mm.

Habitat: Estes Park, Colo. 1 male.

***Tipula cylindrata* n. sp.**

Brown; head very dark brown; rostrum dark brown above, yellowish below; palpi blackish brown; first and second segments of antennæ yellow, third brownish yellow, others dark brown, incised below; collare grayish with three brown spots; metanotum grayish with three brown stripes, each of which is divided by a broad gray line; coxæ, pleura, scutellum and metanotum hoary; scutellum and metanotum with a median brown line; halteres yellow, knobs brown; legs brown, femora somewhat lighter toward the base; abdomen light brown, with a dorsal darker brown line; ninth tergite with a broad deep V-shaped incision, the lateral margins of which are notched; ninth sternite with a narrow very deep incision; the margins of which are continuous for a part of their length; no pleural sutures; pleural margin with a small triangular chitinized projection just outside the base of the short tumid brown third pair of appendages; wings with a grayish tinge, with several irregular more or less distinct whitish spaces; a rather broad, not well-defined whitish band beginning in front of the stigma, covering the distal portion of the first basal cell, crossing the second basal cell a little beyond its middle, and extending along the anal cell to the posterior margin of the wing; indistinct whitish spots in the base of the anal and axillary cells, in the tip of the sub-marginal cell, and in the base of the marginal, sub-marginal, first posterior, discal and fourth posterior cells; stigma and a small spot over the tip of the axillary vein and another over the tip of the præfura, brown. Length 11 mm., wing 13 mm.

Habitat: San Diego, Cal. 3 males.

***Tipula flavomarginata* n. sp.**

Yellow; head cinereous above with a median brown stripe; rostrum, palpi and first two segments of antennæ yellow; third segment yellowish, brownish toward the tip, other segments brown somewhat darker at the base; dorsum of thorax light yellowish with four distinct brown stripes; scutellum and metanotum yellow, with a faint, median, brown line; pleura yellow; halteres yellow toward the base, darker towards the knobs which are dark brown, tips lighter; femora, except the tip, yellowish; tibia and tarsi and the tips of the femora brown; abdomen yellowish at the base, brownish posteriorly, posterior margin of each segment yellow; eighth sternite slightly produced, posterior margin roundly emarginate with two bunches of reddish yellow hairs; ninth tergite produced and narrowed posteriorly, posterior margin with a crescent-shaped incision in the middle of which is a pair of short, black triangular, downward-projecting teeth, the ventral margins of the posterior lateral angles with narrow, elongate, black projections; ninth sternite divided ventrally by a broad membranous area, posterior margin with two pairs of small appendages, the upper pair ovate, tips with long yellow hairs, the lower pair more spatulate, hanging in the crescent-shaped incision in the posterior margin of the sternite; pleural suture distinct; upper pair of appendages narrow toward the base and broader toward the tip the anterior upper corner produced into a finger-

like projection; second pair of appendages broad, irregular in shape anterior margin folded back; third pair broad at the base, slightly narrower toward the tip, anterior upper corner produced into a broad, blunt tip; wings hyaline; the stigma, a small spot over the origin of the præfurca, and a narrow border along the great cross vein and the end of the fifth vein, brown; the whitish band beginning in front of the stigma extends across the discal cell into the fourth posterior cell, (in some specimens reaching almost or quite to the posterior margin); small white spot just beyond the stigma. Length 11 mm., wing 13 mm.

Habitat: San Diego, Cal. 8 males.

***Tipula rusticola* n. sp.**

Yellow; head yellowish, darker above; palpi brown, last segment darker; first and second segments of antennæ yellow, others light brown darker at the base; thorax light yellow, the brownish stripes of the dorsum faintly indicated; halteres yellowish, knobs brown, tips lighter; femora yellowish, tips brown; tibia and tarsus brownish; abdomen yellowish, brownish posteriorly; posterior margin of eighth sternite with two tufts of rather long, reddish yellow, hairs; ninth tergite with a broad, median furrow, lateral angles but slightly produced; ninth sternite divided by a rather broad, whitish membranous portion; from the posterior margin just at the edge of the membrane there arises a pair of chitinized two-parted appendages, the outer posterior part is somewhat spatulate the tip furnished with a fringe of reddish yellow hair, the inner part is broader, longer, somewhat twisted and with a double-pointed tip; first pair of appendages long, slender; second pair broad, black-tipped with three more strongly chitinized ridges; the third appendages are much smaller, unchitinized and have a small soft leaf-like lobe extending outwardly at right angles to the rest of the lobe; wings hyaline, veins brownish yellow; stigma brown; a whitish broken band beginning in front of the stigma and extending across the discal cell into the base of the fourth posterior cell. Length 12 mm., wing 12 mm.

Habitat: Keyport, Wash. 2 males.

***Tipula derbyi* n. sp.**

Yellow; head dark brown pruinose above; rostrum brownish yellow; palpi very dark brown; first, second and basal half of third segment of antennæ, yellow, other segments very dark brown; thorax yellow the three dorsal brown stripes more or less distinctly indicated; halteres brown, yellow at the base, knobs darker; legs yellow, tarsi and the distal portion of the tibia brownish; abdomen yellow somewhat darker posteriorly; dorsal and lateral lines more or less faintly indicated; eighth tergite of male semicircular; eighth sternite produced posteriorly and forming a floor for the genital chamber, posterior margin with a shallow semicircular incision which is filled with a white more or less tumid membrane; posterior lateral angles with sub-triangular chitinized processes, the terminal portion of which bear a few short, curved bristles; ninth tergite divided by a median suture into two sub-rectangular,

somewhat tumid, protruding processes the posterior lateral margins of which are sharply incised; ninth sternite large, lower posterior angles with somewhat curved, downward-projecting spatulate appendages, these are attached by the lateral margin and bear numerous short, reddish brown hairs near the tip; pleural sutures well-developed completely setting off the sharp-pointed triangular pleura, first pair of pleural appendages small, spatulate, second pair with a narrow stalk bearing a large, thin, irregular, rectangular plate; third pair somewhat spatulate, very much larger than the first pair, with rather long reddish hair at the tip; eighth sternite of female rather strongly chitinized, posterior lateral angles produced into short rounded lobes a little longer than wide; two short, broad, two-pointed strongly chitinized appendages arise from the posterior lateral angles of the broad truncate median lobe; ninth tergite very small almost concealed beneath the eighth; tenth tergite also very short, more strongly chitinized, cerci very short, broad, rounded; wings hyaline with a very slight smoky tinge, costal and subcostal cells yellowish; stigma brown, an interrupted whitish band running from in front of the stigma through the discal cell into the base of the fourth posterior cell, another whitish spot behind the stigma, a small indistinct brownish spot at the origin of the præfurca. Length male 13 mm., female 12 mm., wing 12 mm.

Habitat: Stanford University. Many males, 6 females.
Larvæ feeding on grain roots in meadows.

Tipula pacifica n. sp.

Brown; head grayish brown with dorso-median and post-ocular broad, brown lines; rostrum grayish brown, sides darker; first and last segments of palpi dark brown, others lighter brown; first and second segments of antennæ yellowish brown others brownish, darker at the base; antennæ of female more yellowish; thoracic dorsum with very broad, brown stripes which are distinctly bordered by darker brown lines; median stripe divided by a fusiform brown line; lateral margins clouded with brown; dorso-pleural membrane whitish; pleura grayish brown with indistinct brown spots; an irregular brownish line just below the dorso-pleural suture; scutellum almost wholly brown; metanotum grayish with three broad, brown stripes; halteres brownish, knobs darker, tips whitish; legs brownish, tarsi and tips of femora and tibia darker; abdomen brown, darker brown laterally; extreme margins whitish, seventh, eighth and ninth segments almost wholly dark brown; posterior margin of eighth sternite yellowish, not produced posteriorly; posterior margin of ninth tergite yellowish, under surface with two black, triangular, downward-projecting processes; posterior margin of ninth sternite with a broad, deep rectangular incision; pleural suture indistinct, lateral margins with a pair of very large whitish irregular-shaped appendages some of the inner and upper folds of which are furnished with thick, short, black hairs or bristles; upper appendages rather broad, lateral margins somewhat rolled, tip rounded; ovipositor of female reddish brown, upper valves rather long, acute; lower valves

reaching about to middle of upper valves; wings long and broad, brown, with whitish spots in all the cells, a spot in the beginning of the basal cells, the origin of the præfurca, the stigma, the tip of the seventh vein and less distinct spots near the middle of the second basal, anal and axillary cells, darker brown; the margin of the wing is marked with larger or smaller whitish spots in all the cells; irregular whitish spots in the region of the stigma, the discal cell and in the basal anal cells; veins brown, some of them with a narrow brown border. Length male 26 mm., female 33 mm., wing 27 mm.

Habitat: Deer Park, Placer Co., Cal. 3 males, 2 females. (Types). Keyport, Wash. 1 female.

One of the males is much smaller measuring only 20 mm. wing 20 mm. In size and general appearance, this specimen looks somewhat like *T. abdominalis* Say, but the antennæ; the markings on the thorax and the structure of the hypopygium are quite different.

Tipula californica n. sp.

Brownish yellow; head yellowish slightly darker above; palpi brown, yellowish toward the base; first and second and the basal half of the third segments of the antennæ yellow, other segments brown, darker at the base; dorsum of thorax light brownish yellow with four broad, brown stripes; scutellum and metanotum brownish yellow; pleura hoary; halteres whitish, knobs brown, tips lighter; legs yellowish, tips of the femora, tibia and tarsi darker; abdomen yellowish, brownish posteriorly, sides with a distinct broken brown line; posterior margin of eighth sternite with a rounded incision, the middle with a short rounded projection above which arises two slender pencils of yellow hairs; lateral angles with a pair of triangular tooth-like projections which bear a fringe of long yellow hairs on their inner margins; ninth tergite with a deep median furrow and a rather deep V-shaped incision from the apex of which arises a short triangular black-tipped tooth; ninth sternite with a very broad, deep U-shaped incision in which hangs a pair of large, tumid, yellow-haired appendages; apex of this incision with fine short, reddish-yellow hairs which almost conceal two short, conical projections; pleural sutures complete; first pair of appendages somewhat conical, furnished with rather long, black hairs; second pair broad, somewhat flattened edges black; third pair more strongly chitinized, oblong, somewhat twisted, ending in a blunt point; wings hyaline with a slight brownish tinge particularly in the apex; the stigma and a small spot over the tip of the subcostal vein and the beginning of the præfurca, brown; veins with an indistinct whitish border; a whitish spot just before and just behind the stigma. Length 16 mm., wing 20 mm.

Habitat: Palo Alto, Cal. 2 males.

***Tipula rupicola* n. sp.**

Brown; head brownish with broad, darker, dorso-median and post-ocular lines; rostrum darker brown; palpi very dark brown; antennae yellowish darker toward the tip, base of each segment beyond the third blackish; mesonotum tawny the three brown stripes bordered by distinct darker brown lines, the median one divided by a rather broad, dark brown line; dorso-pleural membrane whitish; pleura grayish brown; an irregular line just below the dorso-pleural suture, and other spots, darker brown; scutellum and metanotum brown; halteres light yellow, knobs brown, tips lighter; legs yellowish brown, tarsi and tips of femora and tibia darker, a broad whitish ring on the femora a short distance from the tip; abdomen brown, darker posteriorly, lateral margin darker; ninth tergite somewhat tumid, posterior margin reflexed and with a pair of inconspicuous black edged teeth; pleural suture complete extending to the anterior margin of the segment thus distinctly separating the pleura from the sternum; ninth sternite almost hidden by the eighth sternite; posterior margin with two broad appendages the edges of which are rolled in such a way that the contiguous edges of the two form a large projecting open tube; posterior margin of the pleura rather strongly chitinized, lower corner produced into a short, sharp point; upper pair of appendages broad, short, tips with a shallow rounded incision and with a fringe of black hairs; upper and posterior margin of second pair of appendages furnished with rather long reddish brown hairs the lower angle produced into a rather long spatulate projection; the upper posterior angle of the third pair of appendages strongly chitinized and bearing a few black hairs; wings rather broad and long, brownish with the following parts darker brown: the stigma, a spot over the origin of the præfurca, the base of the fourth posterior cell, the tips of all the veins beyond the apex of the wing, the middle of the posterior margin of the second basal cell, the middle of the anal cell; the distal portion of the second and fifth vein narrowly bordered with brown; a whitish spot beginning in the margin of the wing just beyond the stigma extends into the first posterior cell and follows it to the tip of the wing; another whitish spot beginning in the margin in front of the origin of the præfurca extends diagonally across the first basal and just into the second basal cell; other smaller spots in the discal, anal, axillary and the margins of all the posterior cells, those in the anal cell extending forward into the second basal cell. Length 25 mm., wing 25 mm.

Habitat: Oak Creek Canon, Ariz. 1 male.

The coloring of the body and the wing markings somewhat resemble *T. contaminata* Doane, but there are several differences the most important of which is the structure of the hypopygium. This and the following species, *T. albimacula*, have the pleural sutures well developed thus entirely separating the pleura from the other sclerites. Following Snodgrass, these species

would be in a group lower than any he studied, a group corresponding to the simplest of the brevipalpi where the pleura and sterna are entirely separated.

***Tipula albimacula* n. sp.**

Brownish yellow; head brownish yellow with a darker stripe above; first segment of palpi yellowish others brownish, last segment darker; antennæ yellowish toward the base, growing darker toward the tip, last four or five segments brown; metanotum brown with three broad, darker brown stripes; pleura yellowish, pruinose, with a rather broad, brown stripe extending from above the base of the first coxæ to the base of the wings; scutellum brown with a median lighter line; metanotum yellowish with a very narrow median brown line; legs yellowish, tarsi and tips of femora and tibia darker; abdomen yellowish, spotted with brownish, with dorsal and lateral brown stripes; first, sixth, seventh and eighth terga brownish; ninth tergite tumid, posterior margin with a broad crescent-shaped incision in the middle of which is a small semi-circular incision; ninth sternite similar to the preceding sternites, posterior margin bearing a pair of leaf-like appendages which are attached near the middle of their long sides, the margins of the opposing faces slightly curled in, thus forming an incomplete tube; pleural suture extending to the anterior margin of the segment so that the pleural sclerites are completely separated from the others; upper appendages broad, rounded, margins somewhat more chitinized; lower appendages long, rather broad, somewhat twisted, ending in an upper rather broad, blunt arm and a lower narrow, curved, sharp-pointed claw; wings with a brownish tinge with several lighter and darker spots; an irregular broken V-shaped, whitish band beginning in front of the stigma and ending close to the tip of the sixth vein; a rather large irregular whitish spot on the margin of the axillary cell and other smaller whitish spots in all of the cells in the apical portion of the wing; the whitish spots in the margins of the posterior cells are bordered on each side by brownish spots. Length 20 mm., wing 22 mm.

Habitat: Arizona. 1 male.

See the note in regard to the hypopygium of *T. rupicola*.

***Tipula aspersa* n. sp.**

Brown; head grayish brown with a narrow median, dark brown line above and brownish lines back of the eyes; rostrum grayish brown, darker laterally; palpi dark brown; antennæ yellowish, base of each segment beyond the third black; metanotum grayish with three brownish stripes each of which is margined by darker brown; median stripes divided by a narrow brown line, lower margin of metanotum bordered by a brown line; pleura grayish pruinose with two median brown spots and a brown stripe which begins on the prothorax and ends just beyond the mesopleural suture; scutellum and metanotum grayish, each with a median brown line; a brown spot above the base of the halteres; halteres yellowish, knobs brown; legs yellowish, tarsi and tips of femora

and tibia darker; abdomen brown with darker stripes dorsally and laterally; posterior margin of ninth tergite of male with a pair of shiny, brown, triangular projections between which is a deep narrow U-shaped incision; ninth sternite completely bordered below by a deep V-shaped incision; pleural suture distinct curving upward about the middle of the segment after which it soon disappears; upper appendages long, broad, strap-like, tips rounded; lower appendages broad, the chitinized margins rolled upon themselves, the distal margin with a long, strong claw; upper valves of ovipositor of female long narrow tips rounded; lower valves rather broad, flat, tips acute; wings with a brownish tinge with brown spots at the tips of all the veins, on the origin of the præfurca, and in the second basal and anal cells; third vein and anterior branch of the fourth vein with brownish spots near the middle; second, third and fourth posterior cells with brownish spots toward the bases; stigma brown; an interrupted whitish band beginning back of the stigma and extending across the discal cell into the base of the fourth posterior cell. Length male 14 mm., female 19 mm., wing 17 mm.

Habitat: Pacific Grove, Cal. 1 male, 1 female.

***Tipula planicornia* n. sp.**

Brownish yellow; head yellowish somewhat cinereous above, with a median darker line; palpi yellow, last segment brown; first three segments of antennæ yellow, fourth sometimes also yellowish, others brown, darker at the base; dorsum of the thorax brownish yellow, with three brown stripes the median one divided by a cinereous or yellowish line; scutellum yellow with a median, brown line; pleura and metanotum grayish pruinose; halteres yellow, knobs brown, tips lighter; legs yellow, tarsi somewhat darker; abdomen brownish yellow, darker posteriorly, the median, dorsal, brown line broader than the later lines; posterior margin of the eighth sternite with a shallow rounded incision, middle portion with a whitish membrane from which arises two brush-like tufts of long, light yellow hairs, as both tufts are directed inward they cross each other; lateral angles furnished with a broad, irregular-shaped chitinized appendage, the upper inner angle of which is drawn out into a rather long, flattened, slightly curved claw; the inner (anterior) face of this appendage is furnished with two ridges or keels, the upper one has a serrate, hairy margin, the lower one, running at right angles to the other, is produced into a long, narrow, slightly curved arm; ninth tergite small, posterior margin with two small crescent-shaped incisions between which is a sharp, triangular, furrowed tooth; ninth sternite with a very deep U-shaped incision which is filled with a pair of appendages the posterior faces of which are chitinized and each terminating in a pair of backward-projecting claws, the lower ones long and curved, the upper ones short, less strongly chitinized, inconspicuous; pleural suture complete; upper pair of appendages reddish brown, broadly spatulate, furnished with long, brownish and yellowish hairs; second pair elongate, suddenly broadened about the middle, posterior margin with long yellow hairs, distal margin black, strongly chitinized; third pair yellow, narrowly spatulate; the long, strongly chitinized,

black-tipped, shield-shaped penis guard often shows distinctly between these appendages; abdomen of female long, cylindrical; ovipositor reddish brown, upper valves long, slender, acute, lower valves broader, less acute; wings hyaline with a slight brownish tinge; stigma light brown, inconspicuous; a rather distinct whitish band beginning in front of the stigma and extending through the discal cell into the base of the fourth posterior cell. Length male 18 mm., female 27 mm., wing 19 mm.

Habitat: San Diego, Cal. 20 males, 8 females.

***Tipula pyramis* n. sp.**

Brownish yellow; head yellowish, cinereous above, with a median darker line; palpi yellow, last segment darker; first three segments of antennæ yellow, others brown; dorsum of thorax light yellowish brown, with four broad, brown stripes, the anterior ends of each of which curve slightly outward; between the median pair is a narrow, indistinct brown line; metanotum, pleura and coxæ grayish pruinose; halteres yellow, knobs brown, tips lighter; legs brownish, base of femora yellowish; abdomen brownish yellow, darker posteriorly with three brown stripes which are broader and browner posteriorly; eighth sternite somewhat produced posteriorly, posterior margin with a rather broad, elongated round-tipped flap which is margined with yellowish hairs; above this flap, attached to the inner (upper) surface of the eighth sternite and to the anterior margin of the ninth sternite is a long, flat, tapering, slender process the curved tip of which hooks into the median incision of the posterior margin of the ninth sternite; ninth tergite short, leaving the appendages unusually exposed, divided by a deep V-shaped incision and a dorsal median furrow from which arises a short, conical light-colored process; ninth sternite elongated, posterior margin with a deep incision in which, arising from the margin just below the pleural suture, is a pair of long, slender-pointed appendages; pleural suture very short; first pair of appendages rather short, stout, curved forward near the middle; second pair with the edges rolled up, ending in two black teeth; third pair unusually large, narrow at the base, broad in the middle, tapering to a blunt point, on the posterior margin near the base are two blunt teeth; wings hyaline, costal and subcostal cell with a yellowish tinge; stigma brown; a broken, whitish band beginning in front of the stigma and reaching through the discal cell into the base of the fourth posterior cell. Length 19 mm., wing 19 mm.

Habitat: Pyramid Lake, Nev. 7 males.

***Tipula sylvicola* n. sp.**

Brownish-yellow; head yellowish, cinereous above; palpi brown, first segment yellow; first three segments of antennæ yellow, others brown, somewhat darker at the base; dorsum of thorax grayish brown with three broad, brown stripes, the median one divided by a gray line; scutellum light yellow with a faint median brown line; metanotum and pleura yellowish, pruinose; halteres yellow, knobs brown, tips lighter; legs yellow, tips of femora tibia and tarsi darker; abdomen brownish

yellow, darker posteriorly, the darker dorsal and lateral stripes faintly indicated; posterior margin of eighth sternite with a very broad, rounded incision, middle portion with a narrow white membrane from which arises two brushes of very long, reddish yellow hair; lateral angles with more strongly chitinized, triangular, inward-projecting appendages, the tips and inner margins of which are furnished with yellow hairs; posterior margin of ninth tergite with a broad shallow incision and with a less strongly chitinized yellow border which is quite distinctly set off from the rest of the tergite, the middle of this border is provided with a pair of blackish triangular teeth, the inner margins of which are straight and close together; ninth sternite with a deep narrow U-shaped incision in the upper part of which hangs a pair of tumid, yellow appendages; pleural sutures complete; upper pair of appendages spatulate, yellow, furnished with brownish and yellow hairs; second pair broad, yellow, black-tipped; third pair elongate, tips rounded, margins reddish brown; wings hyaline; stigma brown, a broken whitish band beginning in front of the stigma and extending across the discal cell into the base of the fourth posterior cell. Length 16 mm., wing 17 mm.

Habitat: Keyport, Wash. 5 males (Type). S. Cal. 1 male.

Tipula unglata n. sp.

Brown; head yellowish, cinereous above, with a median darker line; palpi brown, first segment yellow; first three segments of antennæ yellow, third brown toward the tip, other segments brown; thorax grayish pruinose; dorsum with three brown stripes, the median one divided by a gray line; scutellum yellowish with a median brown line; halteres yellowish, knobs brown, tips lighter; legs yellowish, tarsi, tips of femora and tibia brown; abdomen yellowish brown, darker posteriorly with three distinct brown lines; eighth sternite with a slight, rounded incision from which arises two tufts of reddish yellow hair; posterior lateral angles with large more strongly chitinized appendages, the posterior face of which is mostly black, ending in a broad, blunt outer tooth and an inner, narrower, sharper tooth; posterior margin of ninth tergite with a rounded incision in the middle of which are two short, sharp points; ninth sternite divided by a deep, broad U-shaped incision in which hangs a pair of yellowish pendulous appendages and from which projects a pair of conspicuous, strongly chitinized, claw-like appendages; pleural suture complete; first pair of appendages rather broad, brown, tip rounded, with long brown hair; second pair broad, flattened, outer face with a more strongly chitinized fold; third pair elongate, narrowed in the middle, tip rounded; abdomen of female very long, ovipositor reddish brown, upper valves long, acute, tips slightly curved, lower valves long, broad, tips truncate, slightly subcylindrically emarginate; wings hyaline with a brownish tinge; costal and subcostal cell yellowish; stigma and a very narrow border on the great cross vein and the tip of the fifth vein brown; a whitish band beginning in front of the stigma and extending across the discal cell into the base of the fourth posterior cell; and indistinct whitish spot beyond the stigma. Length male 15 mm., female 23 mm., wing 16 mm.

Habitat: San Diego, Cal. 16 males, 4 females.

***Tipula bifalcata* n. sp.**

Yellow; head yellow, cinereous above with a median, darker line; palpi yellow, tips somewhat darker; first and second segments of antennæ yellow, others brown; dorsum of thorax honey yellow, stripes very faintly indicated; rest of thorax yellowish, pruinose; halteres yellow, knobs brown; legs yellow, tips of femora, tibia and tarsi darker; abdomen yellow at the base, brownish posteriorly; eighth sternite produced, narrowed posteriorly; posterior margin with a shallow broad, rounded incision from the middle of which arises a tuft of short, thick, stiff, yellow hairs; lateral angles with a pair of conical processes, the tips of each of which are furnished with a pair of close-set, long, heavy, curved, reddish bristles and several shorter yellow hairs; ninth tergite with a deep median furrow, posterior margin ending in a pair of short, broad, blunt, black teeth, between which is a square incision; posterior lateral angles inflexed; ninth sternite with a deep shield-shaped incision from the sides of which arises a pair of rectangular plates which are imbedded in the membrane and to the tips of which are attached the two-parted base of the long, strongly curved, deeply furrowed, two-pointed guard; just below the end of the pleural suture, which is indicated only at the posterior margin, hangs a pair of flat, truncate appendages, the lower edges of which are furnished with long, thick, reddish yellow hair; posterior margin of pleura with a very slight rounded incision; first pair of appendages long, slender, yellow, curved backward near their middle, tips with long yellow hairs; second pair broad, flattened, base narrower, anterior margin strongly chitinized, with a sharp triangular tooth at the tip and a long, narrow spine near the base of the appendage; inner faces with a series of fine chitinous ridges; third pair well separated from the second, spatulate with anterior angle drawn out into a broad, blunt point; arising from the same common base as the other appendages is a fourth pair of strongly chitinized appendages each consisting of a broad base and a long, regularly upward-curved, tapering hook; wings hyaline; costal and subcostal cell lightly tinged with yellow; stigma brown, indistinct; a faintly indicated whitish spot in front of the stigma. Length 18 mm., wing 19 mm.

Habitat: San Diego, Cal. 1 male.

***Tipula biarmata* n. sp.**

Like *T. bifalcata* with the following exceptions: third joint of antennæ mostly yellow; dorsum of thorax lighter yellow; the posterior margin of the ninth tergite without the median square incision; the truncate appendages just below the end of the pleural suture are more tumid; third pair of pleural appendages elongate, narrow, of the same width throughout; fourth pair of appendages flatter, shorter, less strongly curved; a distinct whitish band beginning in front of the stigma and extending across the discal cell into the base of the fourth posterior cell. Length 18 mm., wing 19 mm.

Habitat: Keyport, Wash. 1 male.

***Tipula sternata* n. sp.**

Yellow; head yellow slightly darker above; palpi brown, yellow at the base; first two segments of antennæ yellow, third brownish yellow, others brown; dorsum of thorax yellow with three brown stripes faintly indicated; scutellum, metanotum and pleura yellowish; halteres brown, base yellow, knobs brown, tips lighter; legs yellow, the tarsi and the extreme tip of the femora and tibia a little darker; abdomen yellow at the base, brownish yellow posteriorly, the three brown stripes only faintly indicated; eighth sternite extending well up on the sides of the abdomen and much produced posteriorly, posterior margin rounded, upper (inner) surface with a median pair of short brush-like tufts of hair and a lateral pair of large whitish, membranous appendages which end in strongly chitinized brown triangular tips; ninth tergite very large about as broad as long, posterior lateral angle produced into a pair of thick heavy, slightly curved pointed horns; posterior margin with two broad, flattened, black-edged teeth between which is a small rounded incision; ninth sternite about concealed by the eighth sternite, only the sides showing; posterior margin with a double incision the heart-shaped anterior part being connected with the rounded posterior part by a narrow channel; in the middle of the heart-shaped part lies the two slender, curved, round-tipped processes which branch off from the base of the guard, the guard itself being long, shield-shaped and with seven black teeth or spines toward the tip, the largest and longest arises from the middle line of the posterior face not far from the tip; pleura very small, suture complete; first pair of appendages small, whitish, spatulate, tip with brown hairs; second pair flattened, posterior margin rounded, anterior margin more strongly chitinized, black, ending in a heavy triangular tooth with a much smaller spine just before it; third pair closely joined to the second forming a rounded lobe on its posterior margin; wings hyaline, costal and subcostal cells and stigma with yellowish brown tinge; veins brown. Length 17 mm., wing 18 mm.

Habitat: Stanford University, Cal. 2 males.

***Tipula tergata* n. sp.**

Brown; head yellowish, somewhat cinereous above; palpi yellow, last segment brown; first two segments of antennæ yellow, the third yellowish, brownish toward the tip, other segments brown, slightly swollen at the base; dorsum of thorax light yellowish brown with four distinct brown stripes; scutellum and metanotum light brown with a median darker line; pleura grayish, pruinose; halteres yellow, knobs brown, tips lighter; legs brown, coxæ and basal portion of femora yellow; first two or three segments of abdomen yellowish, others brownish, posterior margin of each light yellow; eighth sternite very large, the broad posterior margin with a very slight rounded incision, the narrow, whitish membrane at the middle provided with two tufts of reddish yellow hair; lateral angles with irregular-shaped appendages, ending in an upper blunt and a lower sharper lobe, the posterior faces strongly chitinized; ninth tergite large, about as broad as long, posterior latera

angle produced into two long, triangular processes, the tips of which are slightly curved and acute; on the posterior margin at the base of the inner face of these processes is a pair of short, black, blunt projections; ninth sternite divided by a deep broad membranous depression on the lower margin of which are two small chitinous rings and from the upper portion of which arises the long curved, highly chitinized, beak-like guard; in the lateral margin of this depression just below the pleural suture, which is complete, is a small, short, curved claw, and a short yellow-haired, tumid process; the posterior angle of the pleura produced into a short, broad, triangular point; first pair of appendages small, very light brown, gently curved forward, with reddish brown hair; second pair broad, flat, twisted, ending in a heavy, black, triangular tooth; third pair broadly joined to the second, elongate, distal half suddenly narrowed; wing hyaline, costal and subcostal cell yellowish; stigma brown; a faint whitish spot in front of the stigma; Length 17 mm., wing 17 mm.

Habitat: Pyramid Lake, Nev. 2 males, (Type). S. Cal. 1 male.

Similar in appearance to *T. sternata* but differs in the markings of the thorax and the details of the structure of the hypopygium.

***Tipula flavicoma* n. sp.**

Yellow; head yellow with a narrow brown stripe above; rostrum yellow; first three segments of palpi yellow, last segment brown; first three segments of antennæ yellow, fourth segment yellowish brown, others brown; metanotum brownish yellow with thin indistinct brown stripes, the median one divided and faintly bordered by darker brown; pleura light yellow, pruinose; scutellum and metanotum yellow; halteres yellow, knobs brown; legs yellow, tarsi and tips of femora and tibia darker; abdomen yellow with distinct brown lines above and on the sides, the latter wavy; eighth sternite somewhat produced posteriorly, posterior margin truncate with a fringe of light yellow hairs; inner sides of the lateral angles, which are somewhat produced, with tufts of long yellow hair; ninth tergite with a median rather broad U-shaped incision and lateral very slight rounded incision; ninth sternite with a very deep, broad, rounded incision in which hangs a pair of long, yellow, tumid, hairy appendages; pleural suture complete, the upper portion faintly marked, posterior margin of pleura with a broad, shallow, rounded incision; first pair of appendages small, spatulate, second pair broad, twisted, tips black, third pair broad, flat, tips rounded; wing hyaline; veins and subcostal cell yellowish; stigma brownish, rather indistinct; a whitish interrupted band beginning in front of the stigma and extending across the discal cell into the base of the fourth posterior cell; indistinct whitish spots in the second basal, anal, and axillary cells. Length 17 mm., wing 16 mm.

Habitat: Montana. 1 male.

Tipula biuncus n. sp.

Brownish yellow; head yellowish, cinereous above with a median darker line; palpi yellow, first two segments of antennæ yellow, others brown; dorsum of thorax cinereous with three median brown lines and two lateral broader brown stripes; dorsal pleural membrane yellow; pleura grayish, pruinose; halteres yellow, knobs brown, tips lighter; legs yellow, tarsi and the tips of the femora and tibia brown; abdomen brownish yellow with three brown stripes, the dorsal one broad and distinct the lateral ones broken; posterior margin of eighth sternite with a very slight, rounded incision with a few reddish yellow hairs; ninth tergite with a very deep V-shaped incision; posterior lateral angles sharp-pointed; ninth sternite divided by a deep, broad furrow in which hang two very short, tumid, yellow appendages; pleural sutures complete; lower angle of pleura produced into a short, blunt point; first pair of appendages broad, spatulate, brown, thickly covered with brown hair; second pair flattened, black-tipped, third pair closely joined to second, yellowish, rounded; a pair of long, slender, sharp-pointed, slightly curved hooks projects beyond the appendages; base of ovipositor brown, valves yellow; upper valves slender, straight, tips rounded, lower valves broad, triangular, short, not reaching half way to the tips of the upper valves; wings hyaline; subcostal cell tinged with yellow; stigma brown; a very faintly indicated broken whitish band beginning in front of the stigma and extending across the discal cell into the base of the fourth posterior cell. Length male, 12 mm., female 15 mm., wing 13 mm.

Habitat: S. Cal. 1 male, 1 female.

Tipula meridiana n. sp.

Gray; head grayish, darker above; rostrum grayish above, brownish on the sides; palpi brownish; metanotum light yellowish with three broad, ashen stripes, each of which are distinctly brown bordered and the middle one divided by a narrow brown line; pleura, scutellum and metanotum grayish, pruinose, latter with a median brownish line; halteres yellow, knobs brownish at the base; legs brownish yellow, tarsi darker; abdomen brown; eighth sternite distended below to make room for a rather large, tumid appendage that arises from the ventral side of the base of the ninth sternite; ninth sternite with a deep V-shaped incision and a median suture which extends to the base of the segment; pleural suture complete setting off a large rectangular sclerite, the posterior ventral corner of which is extended into a blunt point which bears the appendages; the first pair of appendages somewhat ovate, second pair broad at the base, distal half twisted and more strongly chitinized; posterior margin of ninth tergite with two close-set, black-tipped, blunt projections; wings almost hyaline with a slight brownish tinge; an indistinct whitish stripe in the first basal cell extending through the first posterior cell to the tip of the wing; all the veins with a more or less distinct brown border. Length 11 mm., wing 15 mm.

Habitat: Arizona. 1 male.

***Tipula spatha* n. sp.**

Yellow; head yellow slightly darker above; palpi yellow; first two segments of antennæ yellow others wholly brown; mesonotum yellowish brown with three brown stripes, the median one divided by a lighter line; pleura yellow, pruinose; scutellum and metanotum yellow; halteres brown, base yellow, tips of knobs yellowish; legs yellow, tarsi and tips of femora and tibia darker; abdomen yellow, darker posteriorly, posterior margin of each segment lighter; eighth sternite very large, brownish yellow; posterior margin with a median rectangular projection, distal side of which is fringed with short yellow hairs; laterad of this is a pair of club-shaped appendages the tips of which are provided with long, stiff, reddish hairs; ninth tergite divided by a deep, V-shaped incision and a deep furrow which reaches to the anterior margin where it widens considerably, the posterior margin ending in two sharp downward-projecting points; posterior margin of ninth sternite with a very deep, broad, U-shaped incision from the anterior margin of which arises a long, rather broad and tumid, light yellowish process; pleural suture complete, setting off a rather large rectangular sclerite; upper appendage broad, flat, rounded, base narrower, margins with long yellow hairs; second appendages broad, thin, margins with fine black hairs; below the pleural suture is a pair of tumid appendages which bear long yellow hairs; between these, projecting from the genital chamber are three long, strongly chitinized organs, the upper pair are long, narrow, sharp-pointed, the lower one is wider and has a broad, downward-projecting tip; wings hyaline, subcostal cell yellowish, a whitish band beginning in front of the stigma and extending across the discal cell into the base of the fourth posterior cell; stigma brown; fifth vein narrowly bordered with brown. Length 23 mm., wing 22 mm.

Habitat: Arizona. 1 male.

***Tipula occidentalis* n. sp.**

Brownish yellow; head yellowish, cinereous above with a median darker line; rostrum yellowish at the base, brownish toward the tip; first three segments of antennæ yellow, others brown, darker at the base, distal end of segments 4, 5, 6, 7, more or less yellowish; dorsum of thorax light yellowish, with three brown stripes, the median one divided by a light line; scutellum and metanotum very light brown with a median brown stripe, sides of metanotum brown; pleura very light yellow, with indistinct grayish spots; halteres yellow, knobs brown, tips lighter; legs yellow, tips of the femora, tibia and tarsi darker; abdomen brownish yellow, darker posteriorly, with three distinct brown stripes, the dorsal one the broadest; posterior margin of each segment whitish; posterior margin of eighth sternite with a rounded incision from the middle membranous portion of which arises two brushes of rather long, yellow hair; lateral angles with triangular hooked appendages the tips of which are furnished with a few yellow hairs; ninth tergite with a very broad, deep, V-shaped incision; ninth sternite divided ventrally by a rather

broad, membranous portion, posterior margin with a broad, shallow U-shaped incision in which hangs a pair of tumid, yellow, hairy appendages; pleural suture complete; first pair of appendages brown, furnished with brown hairs, long, gently curved near the middle, tip rounded; second pair broad, more strongly chitinized, ending in two strong, blunt points; third pair closely joined to the second, quadrate, yellow, less strongly chitinized; wings hyaline with a faint brownish tinge; the stigma and faint spots over the tip of the subcostal vein and the origin of the præfurca, brown; the whitish band beginning in front of the stigma extending across the discal cell into the base of the fourth posterior cell. Length 15 mm., wing 17 mm.

Habitat: San Diego, Ca¹. 6 males.

***Tipula flavocauda* n. sp.**

Brown; head yellowish brown, cinereous above; palpi yellow, last segment brown; first three segments of antennæ yellow, others brown, darker at the base; dorsum of thorax gray with four brown lines; scutellum, metanotum, pleura and coxæ grayish pruinose; halteres yellow, knobs brown; legs yellow, tibia and tarsi darker; abdomen yellowish brown with three broad, brown stripes; posterior margin of eighth tergite with a median tuft of short, light yellow hairs between a pair of irregular-shaped, six-sided, box-like appendages which, when folded in place, show only one of the broadly triangular surfaces; ninth tergite brown, posterior and lateral margins yellow; posterior-lateral angles produced into two broad, truncate projections each bearing on its ventral side a short, sharp, triangular tooth; between the lateral projections and separated from them by small rounded incisions is a median pair of short, sharp-pointed, broadly triangular projections; posterior margin of ninth sternite with a rounded incision from the membranous middle portion of which arises a pair of rather prominent, strongly chitinized, horn-like projections; above these, usually concealed by the pleural appendages, is a group of four other chitinous appendages, the lateral pair long, slender, sharp-pointed and bent at right angles near the center, the upper member of the group is strong and beak-like, the lower member weak, slender and hooked at the tip; in the lateral margins of the incision, just below the pleural sutures is a pair of very short, yellow, tumid appendages the tips of which are furnished with yellow hairs; pleural sutures complete, posterior margin of pleura with a short triangular tooth; upper pair of appendages slender, whitish with many brown hairs; second pair brown, flat, ending in a sharp, heavy, black, triangular point; third pair closely united to the second, consisting of two lobes the anterior one sharp-pointed, the posterior one truncate; upper valves of ovipositor long, tips rounded and slightly curved upward; lower valves weakly chitinized, short, reaching only to the base of the upper valves; wings hyaline, costal and subcostal cells, the stigma and the veins brown. Length 16 mm., female 20 mm., wing 17 mm.

Habitat: San Diego, Cal. 3 males, 3 females.

CHANGE OF NAMES.

Mr. C. P. Alexander has recently called my attention to the fact that some of the names that I used in describing certain *Tipula* in my article in Jour. N. Y. Ent. Soc. Vol. IX No. 3 (1901), were preoccupied. Some of these I had noted before but had neglected to change them. I now wish to propose the following changes:

Page 107, for *Tipula clara* substitute *T. pellucida*.

Page 115, for *Tipula concinna* substitute *T. olympia*.

Page 119, for *Tipula albovittata* substitute *T. vittatopennis*.

Page 121, for *Tipula contaminata* substitute *T. commiscibilis*.

Page 124, for *Tipula graphica* substitute *T. fulvilineata*.

A PROBLEM IN THE FLIGHT OF INSECTS.

HERBERT OSBORN.

In the usual explanations for the flight of insects, the mechanism is considered essentially as a plane with a rigid anterior border, flexible hinder border and with a vertical movement so that the vibrations result in the forward propulsion of the insect and, so far as I am aware, no further discussion of the modes of progression have been presented. There is, however, another feature in the flight of insects which appears to me to be well worthy of notice and which is not explained by the application of these principles, at least without some modification. Insects, aside from the direct forward flight, are able to hover or even fly distinctly backward as of course everybody who has observed insects must have noticed. It is only necessary to recall the hovering flight of swarms of insects in the air, such as midges, gnats, certain species of flies, May-flies, and even grasshoppers, to appreciate the distinctness of this feature of flight. For a distinctly backward progression, we may cite the approach and retreat of the hawk moths in their visits to flowers, the backward and forward movements of bees as they light or rest upon plants, the dragon-flies, and perhaps especially the backward flight of the honey bee in its initial flight from the hive when it is fixing the location of the entrance to its hive.

Now if we consider the mechanism of the wing as simply a membrane with a rigid anterior border and the progression